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Lee et al.

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(54) **PROTECTIVE STRUCTURES FOR CONNECTOR CONTACTS**

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Related U.S. Application Data

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(51) **Int. Cl.**

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H01R 13/506	(2006.01)
H01R 13/514	(2006.01)
H01R 13/627	(2006.01)

(52) **U.S. Cl.**
CPC ***H01R 13/506*** (2013.01); ***H01R 13/514*** (2013.01); ***H01R 13/627*** (2013.01)

(58) **Field of Classification Search**
CPC .. H01R 13/502; H01R 13/506; H01R 13/514; H01R 13/627
USPC 439/137, 660, 693
See application file for complete search history.

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(57) **ABSTRACT**

Connector receptacles having protective structures for connector contacts. One example may provide a connector receptacle having one or more contacts that are reinforced with a protective piece around a portion of the contact. Another example may provide a connector receptacle having two or more contacts reinforced with adjacent protective pieces to provide additional protective reinforcement. Another example may provide a connector receptacle having two or more contacts reinforced with interlocking protective pieces. These protective pieces may protect contacts in a connector receptacle from damage when a device, module, or connector insert is inserted into the connector receptacle at an oblique angle, when a device, module, or insert is stressed while in the receptacle, or when a device, module, or insert is removed from the receptacle at an oblique angle.

20 Claims, 15 Drawing Sheets

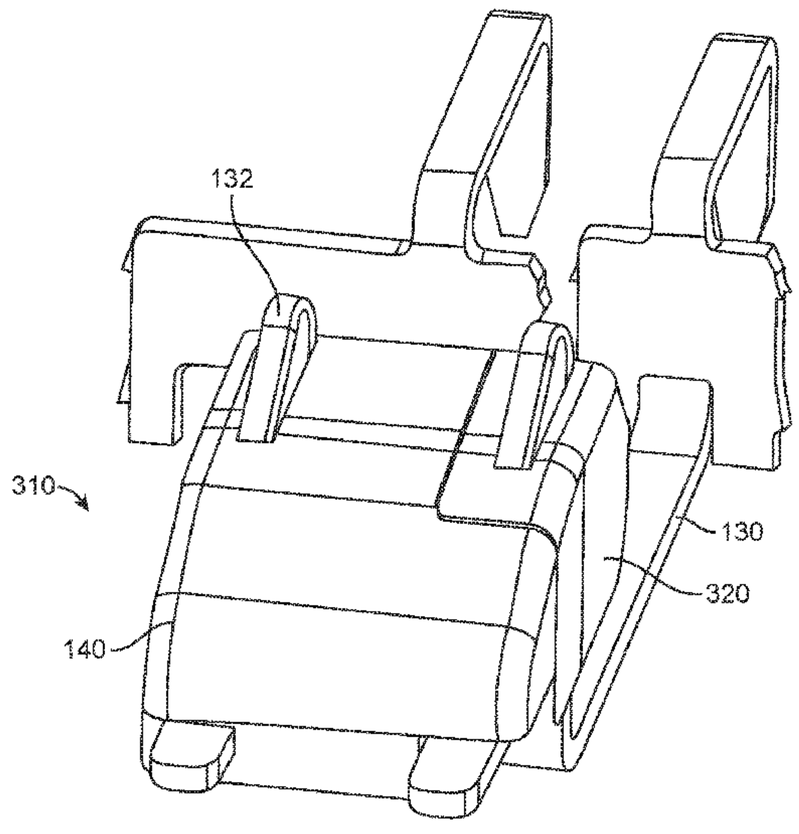

FIG. 1

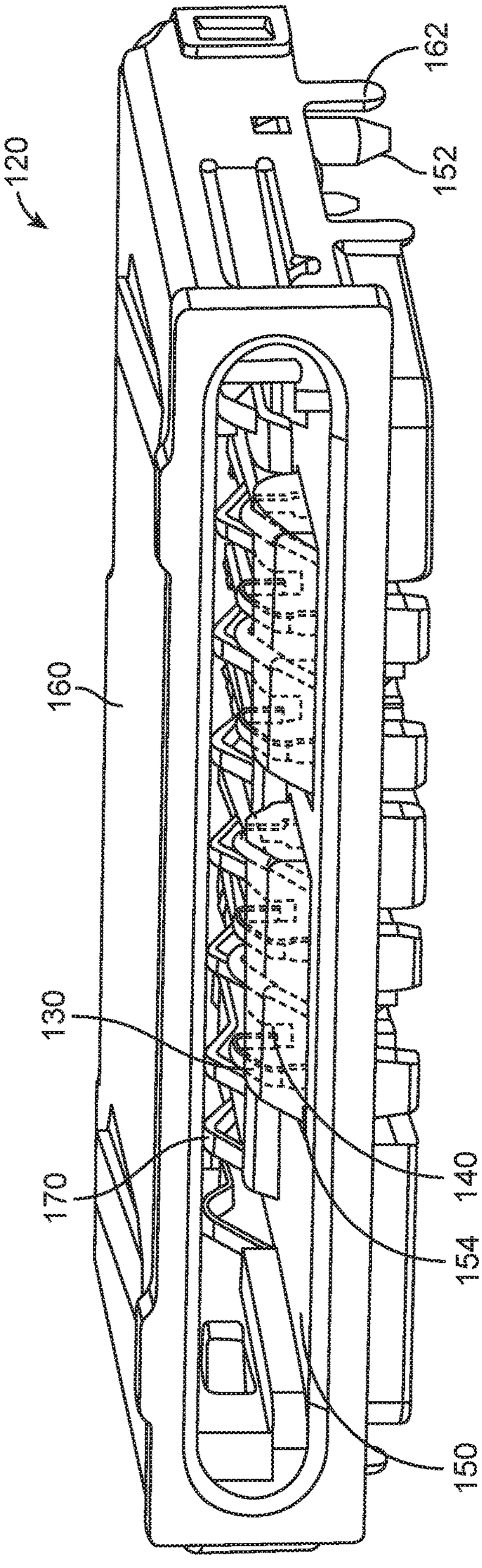

FIG. 2

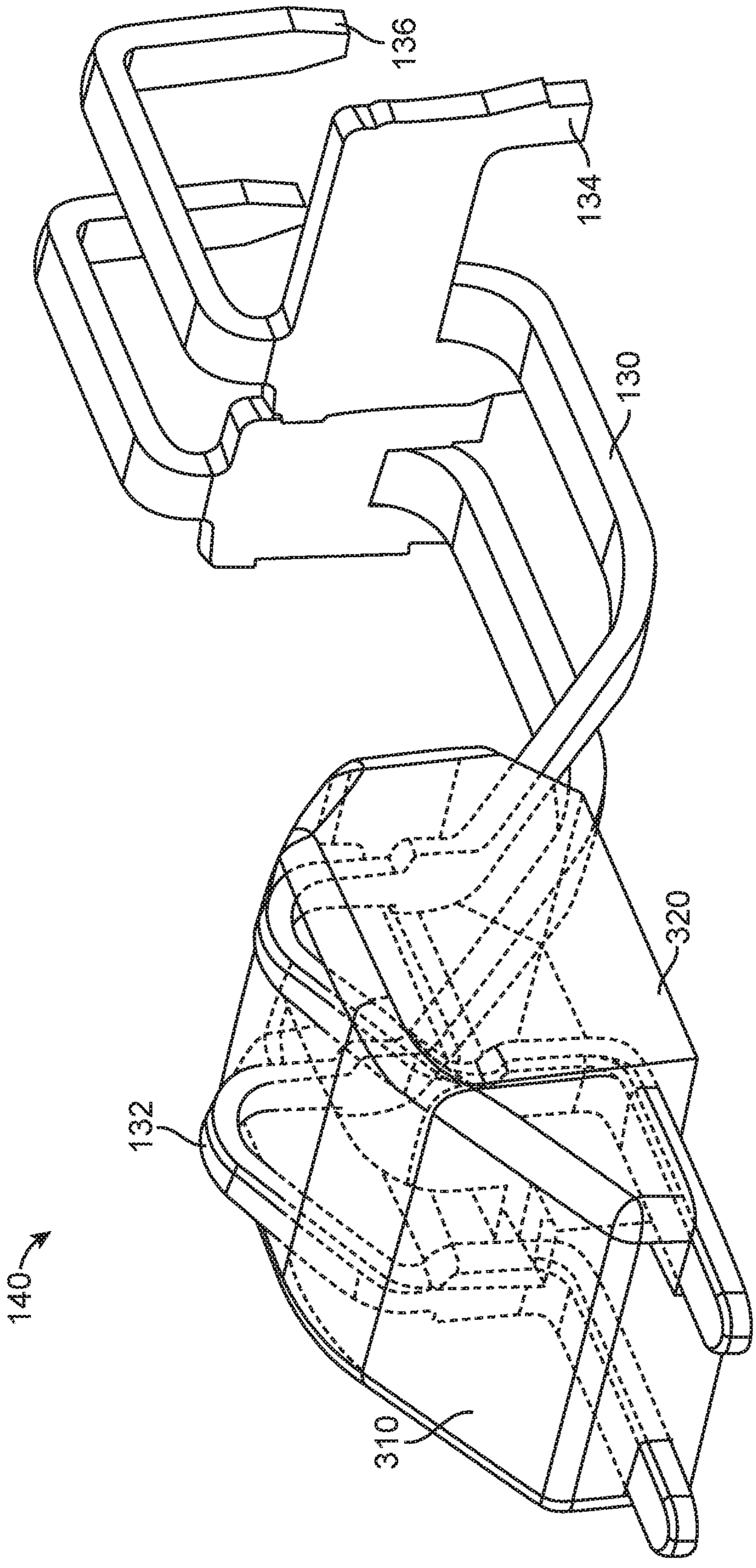

FIG. 3

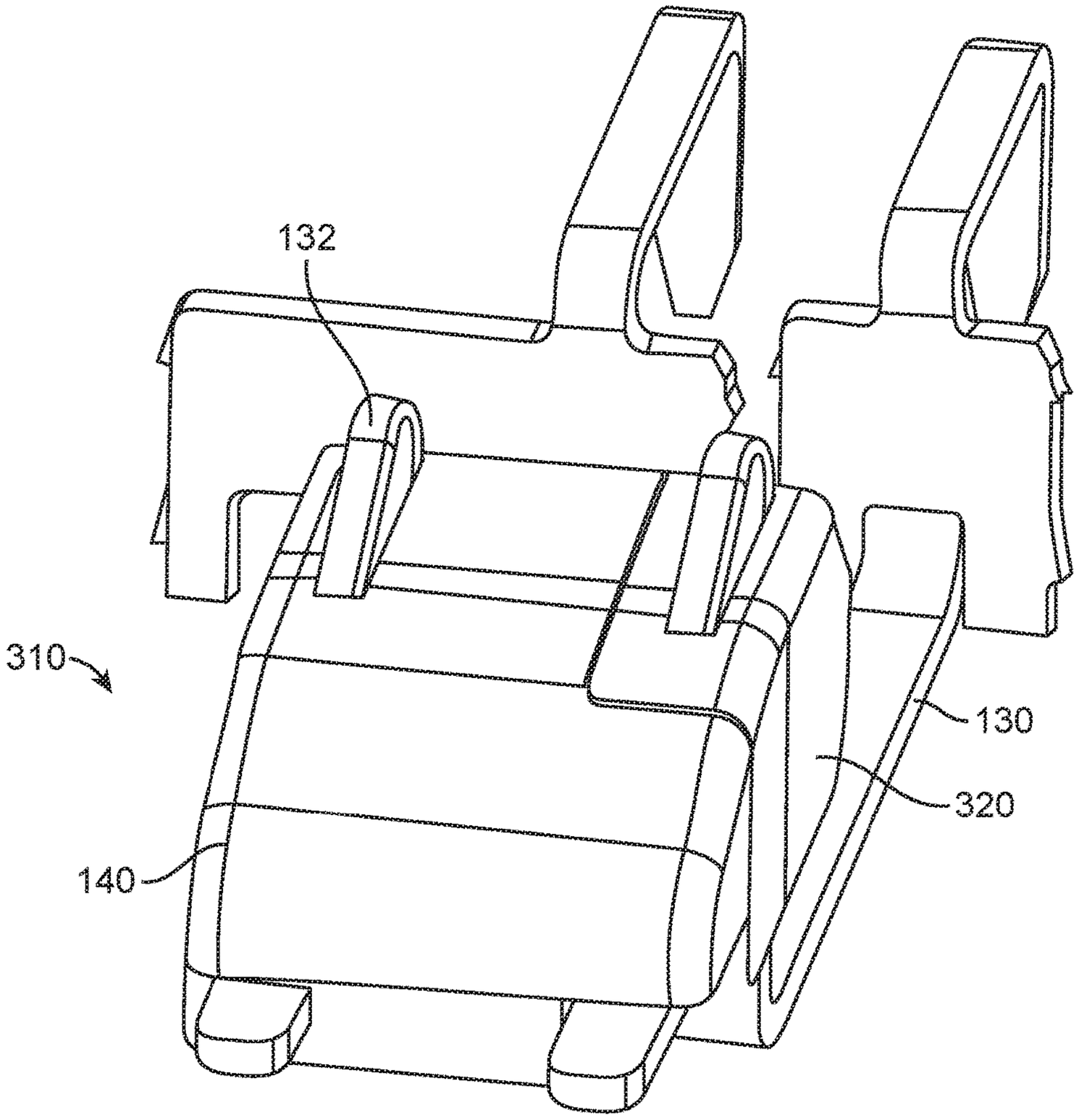

FIG. 4

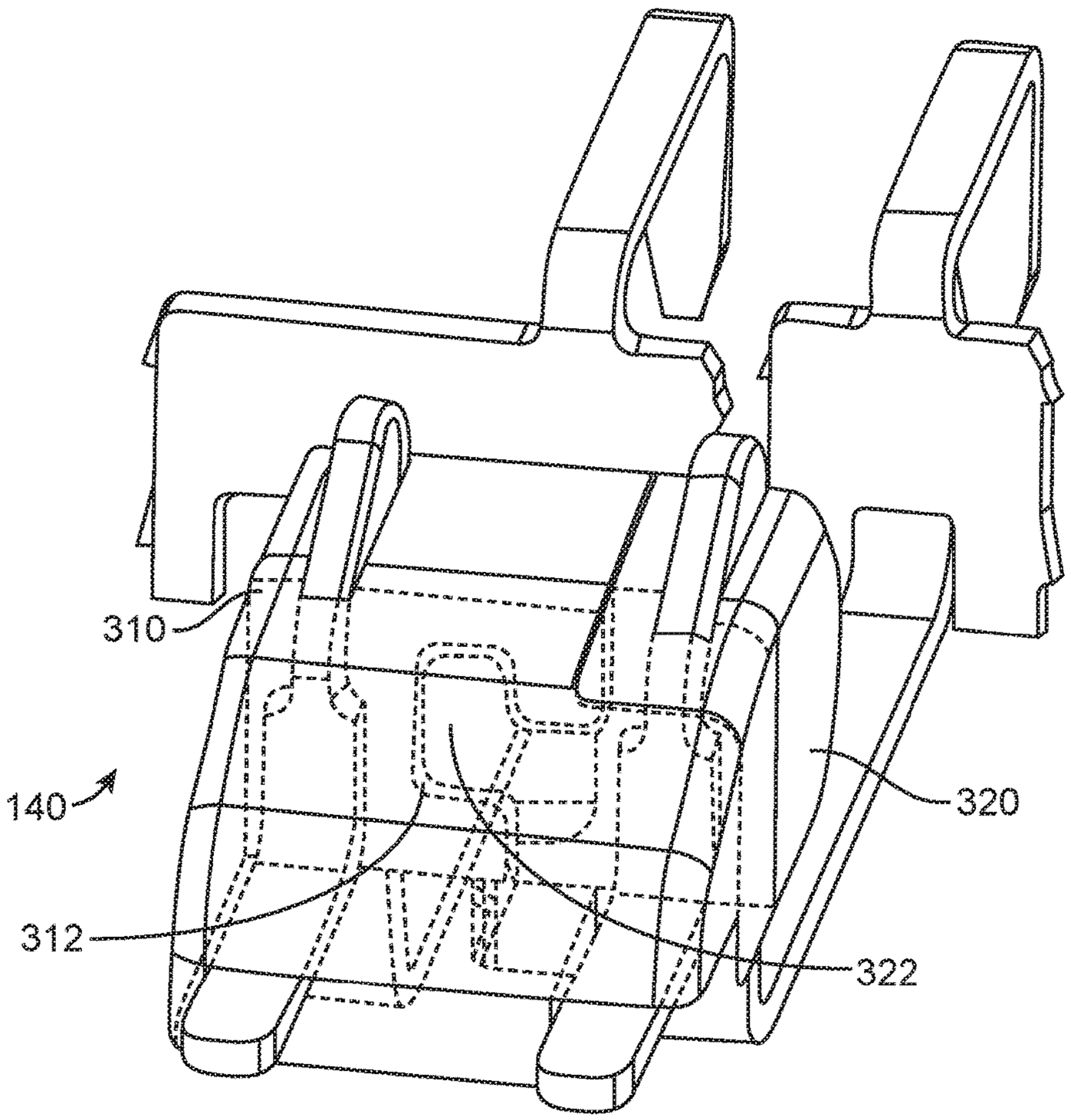

FIG. 5

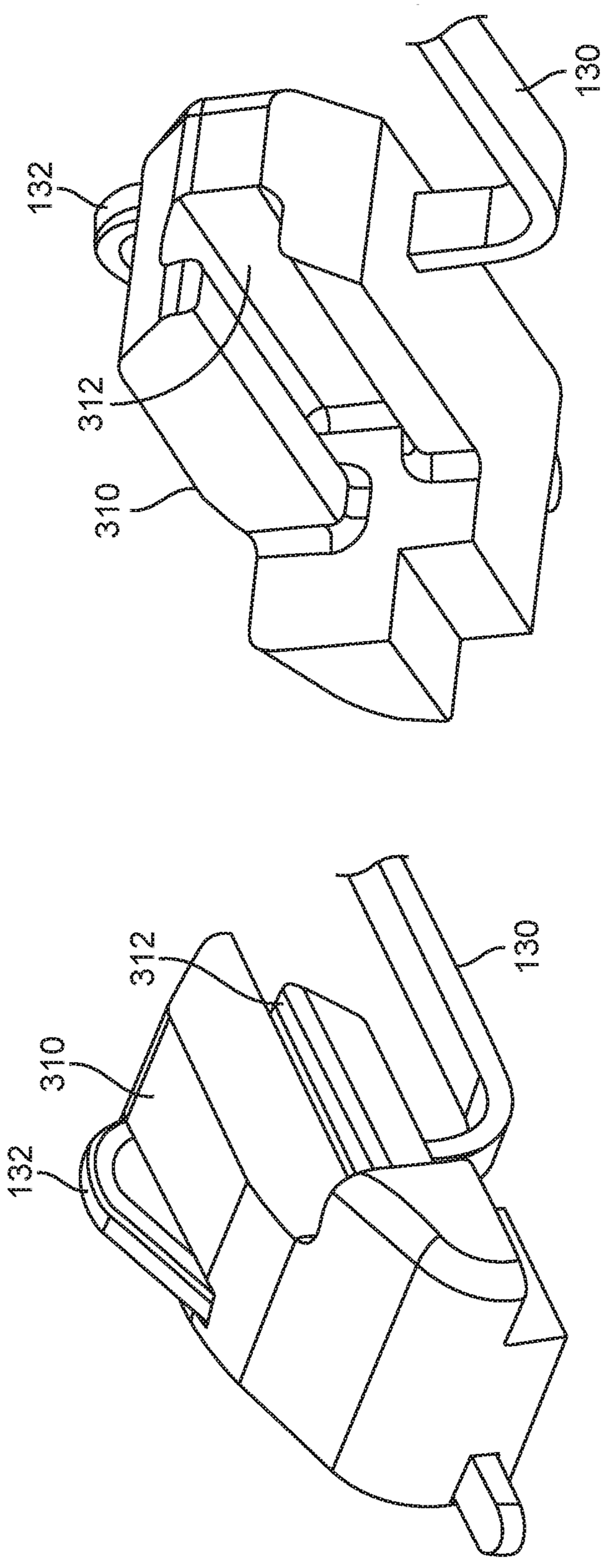

FIG. 6

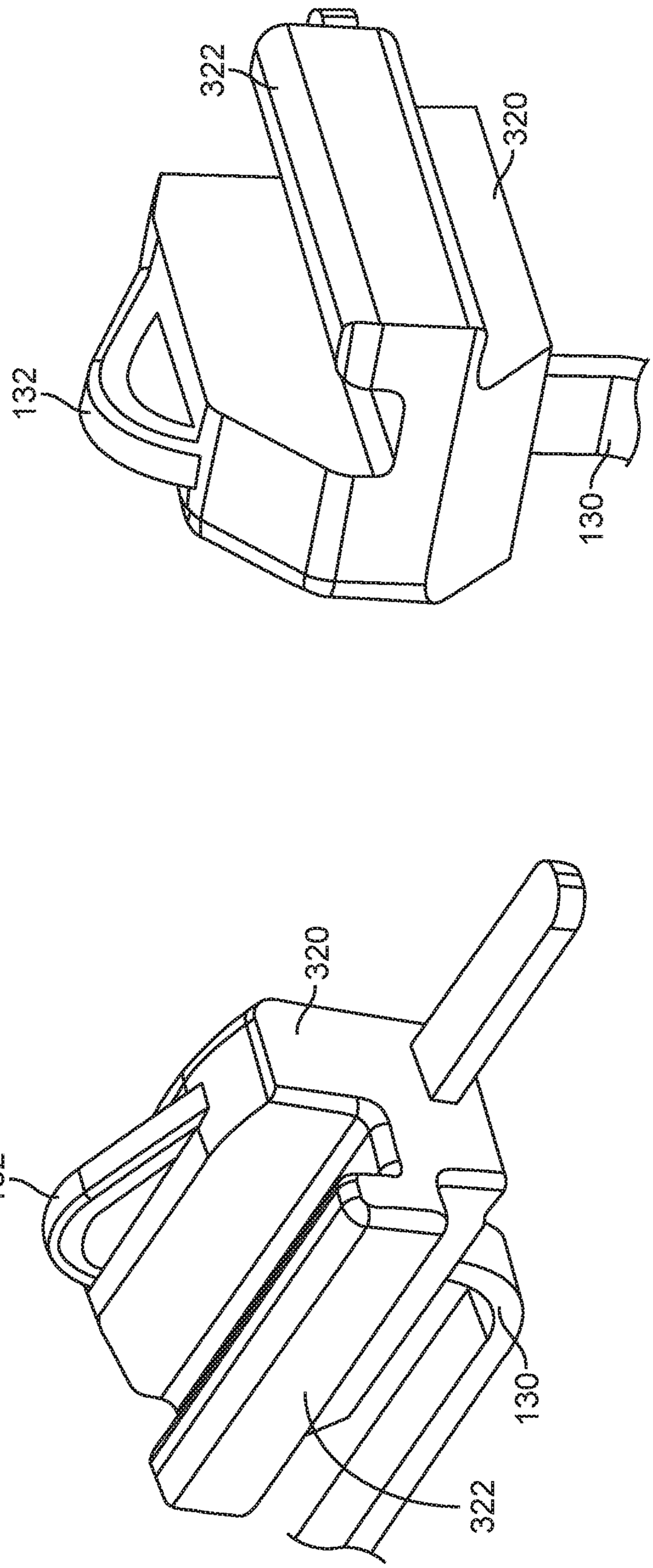

FIG. 7

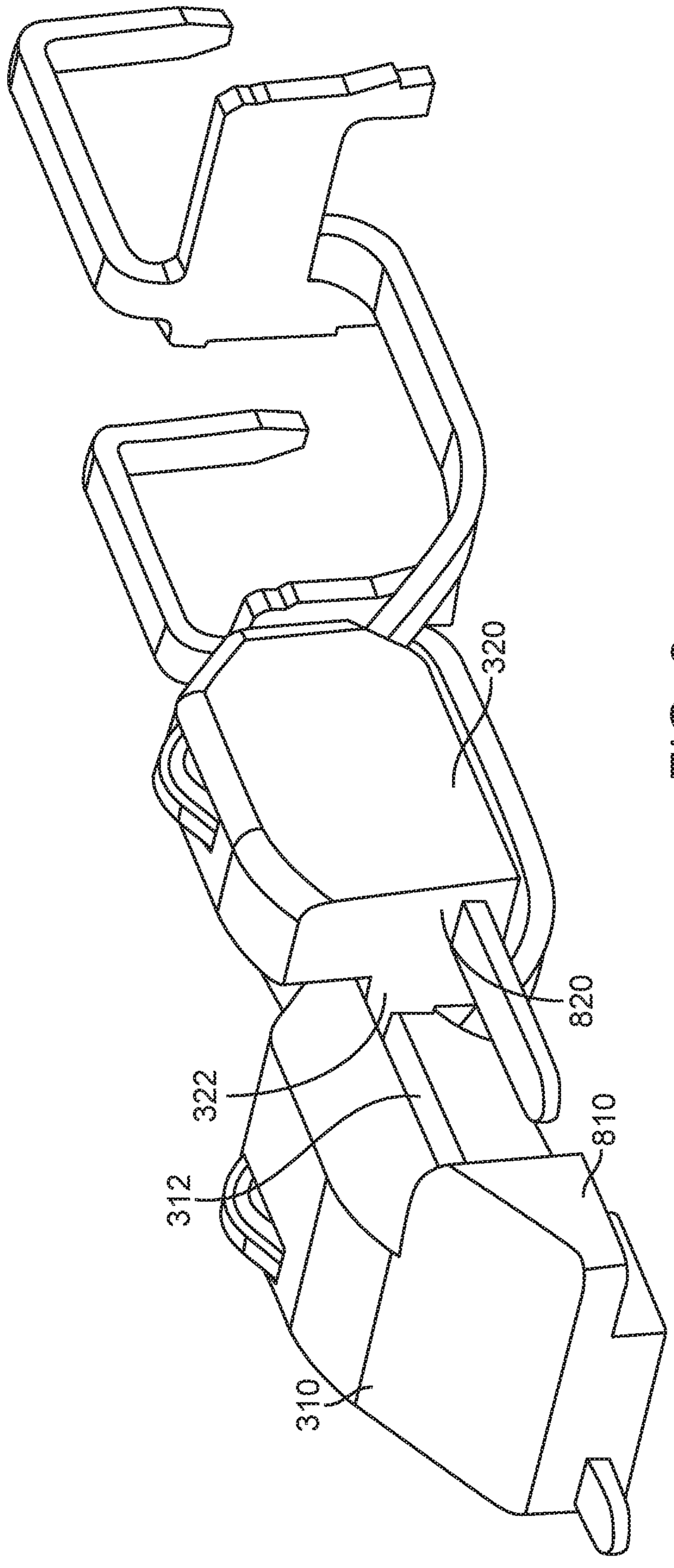

FIG. 8

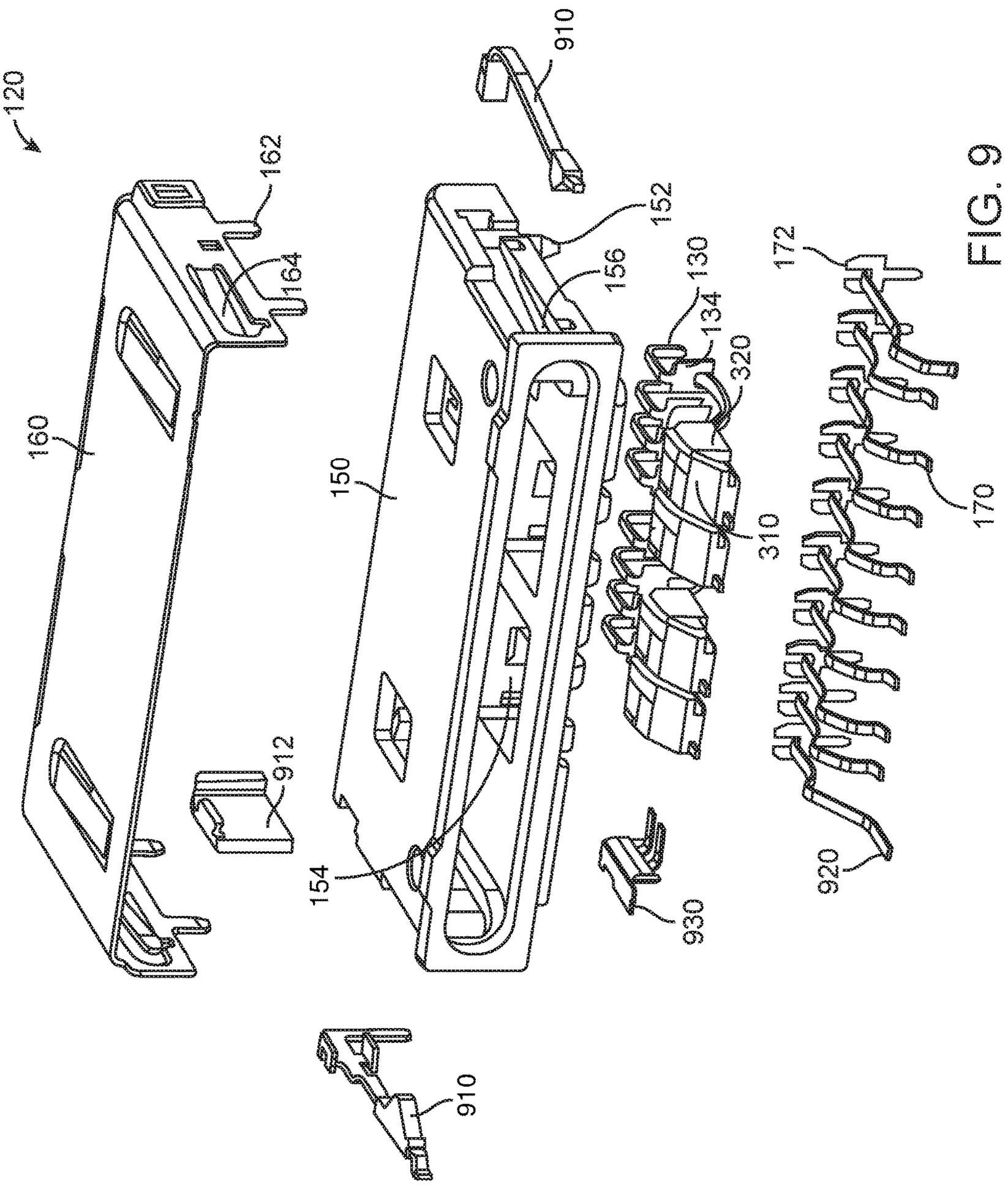
910
120
162
164
160
912
150
152
156
130
134
320
310
172
170
154
930
920
910

FIG. 9

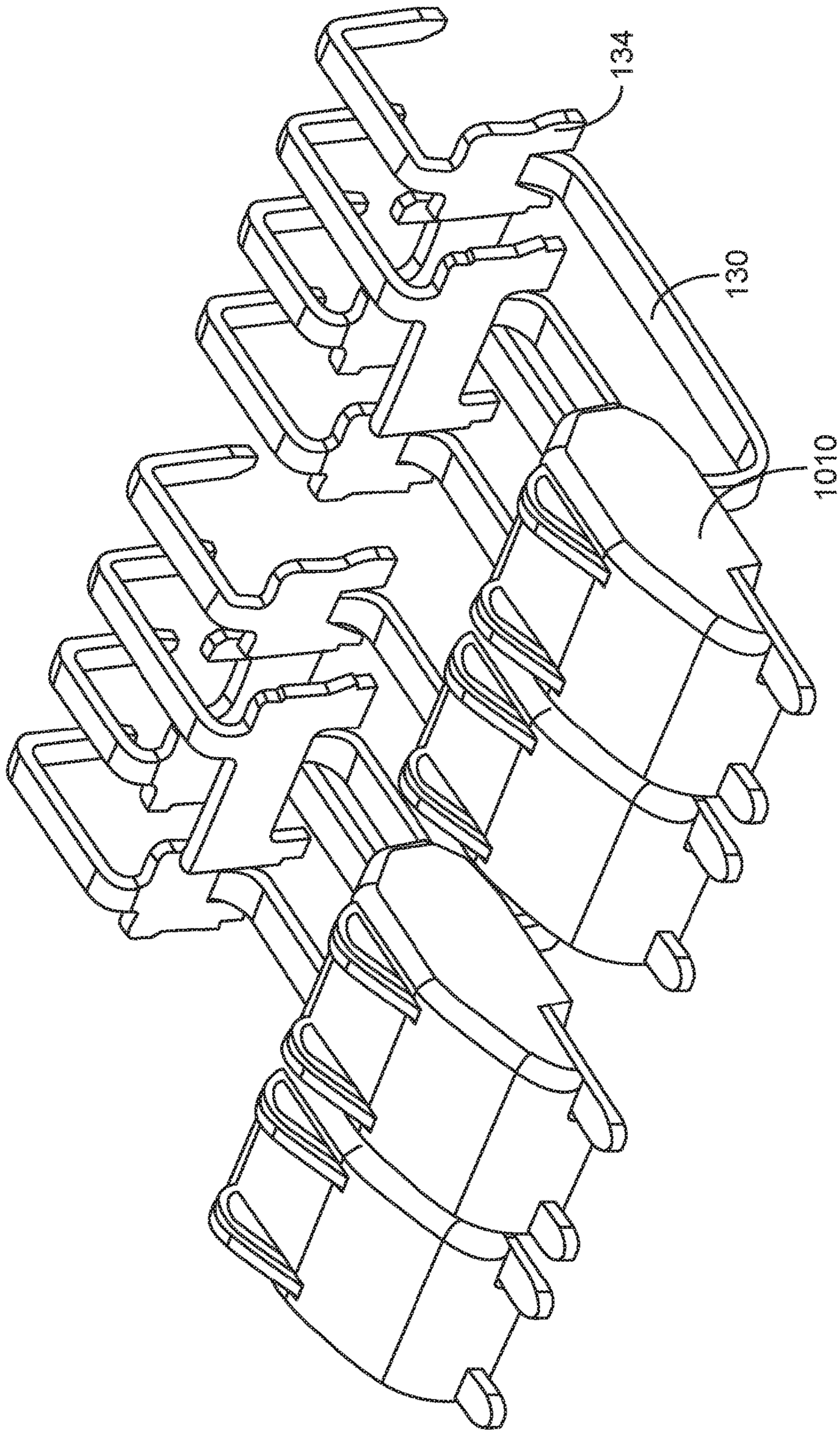

FIG. 10

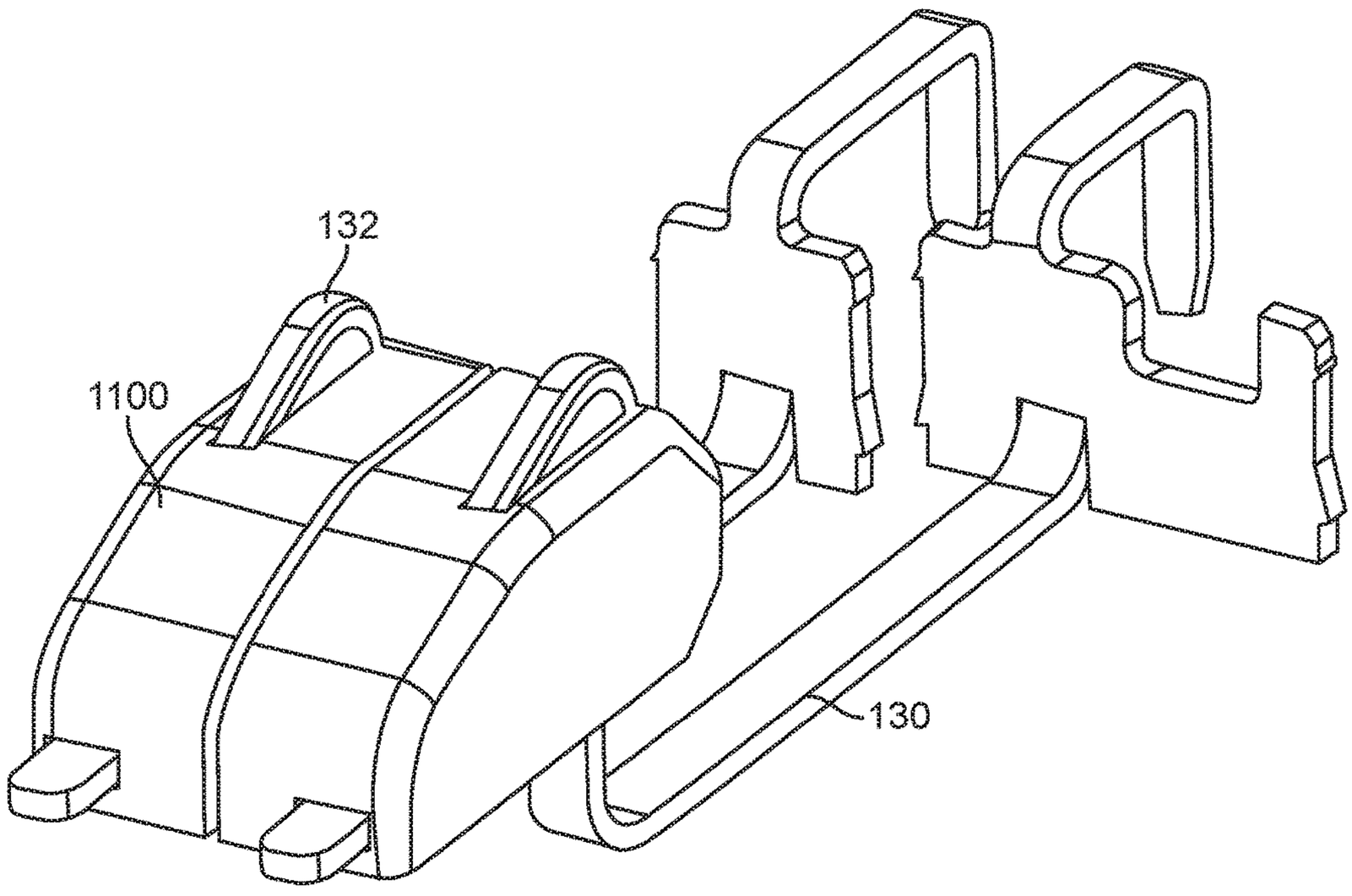

FIG. 11

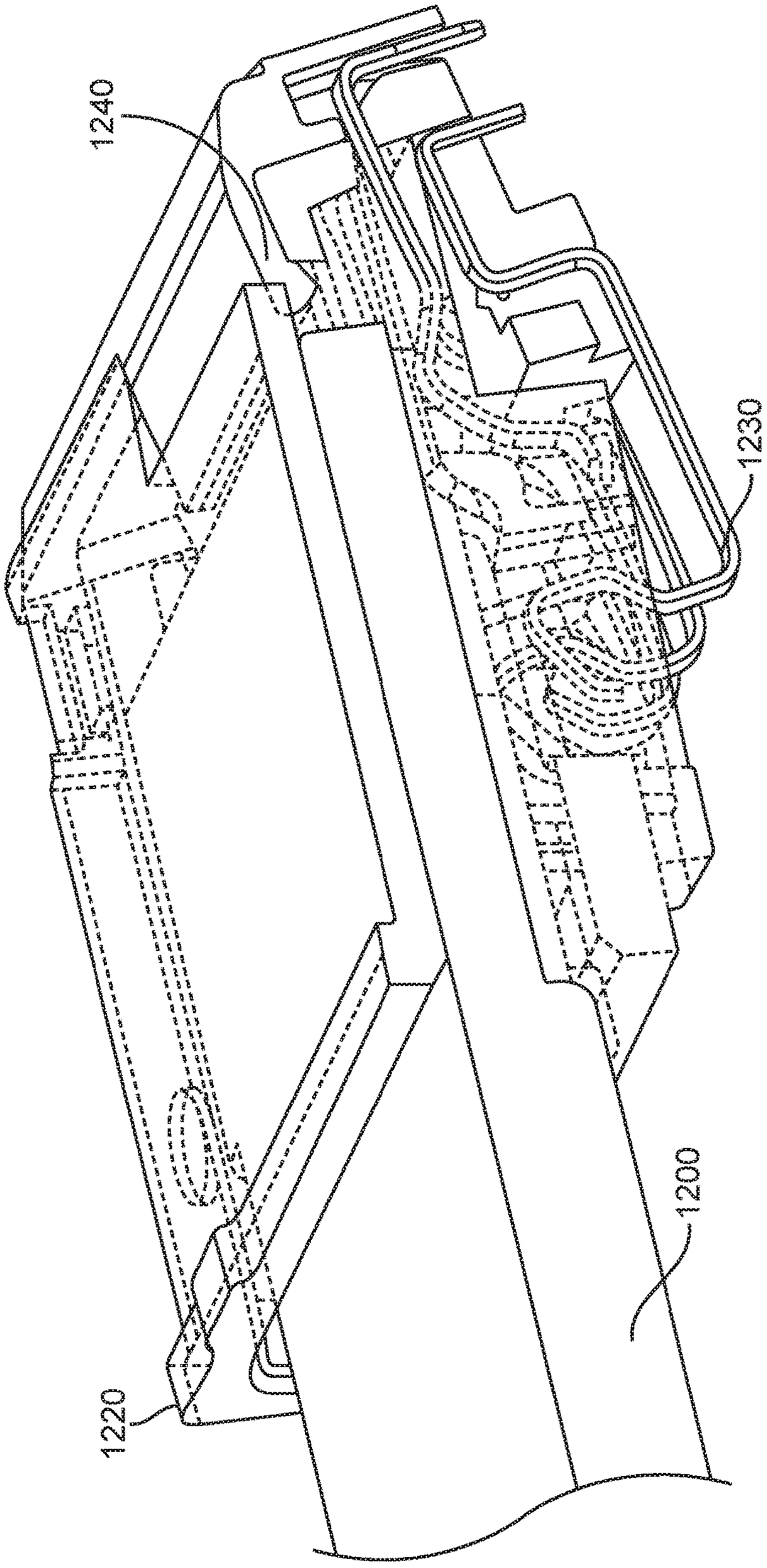

FIG. 12

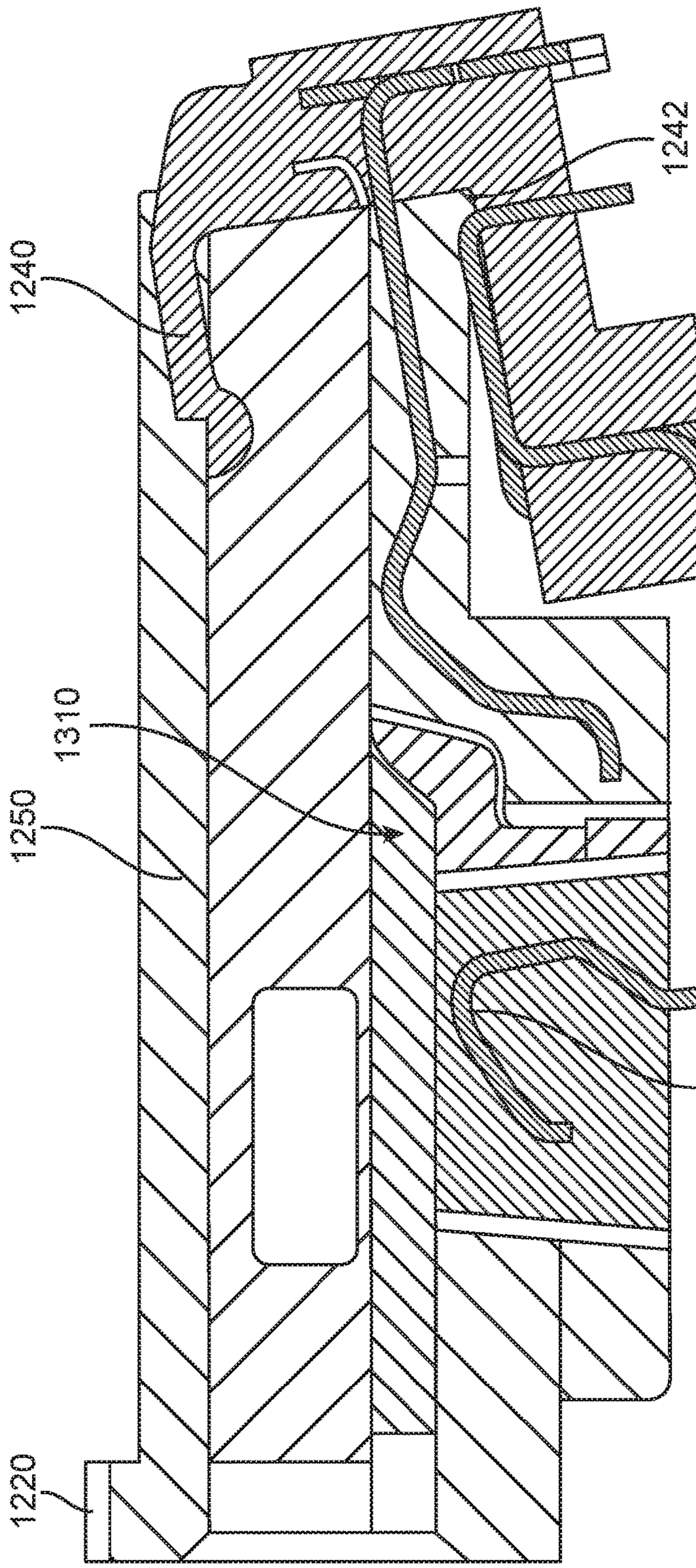

FIG. 13

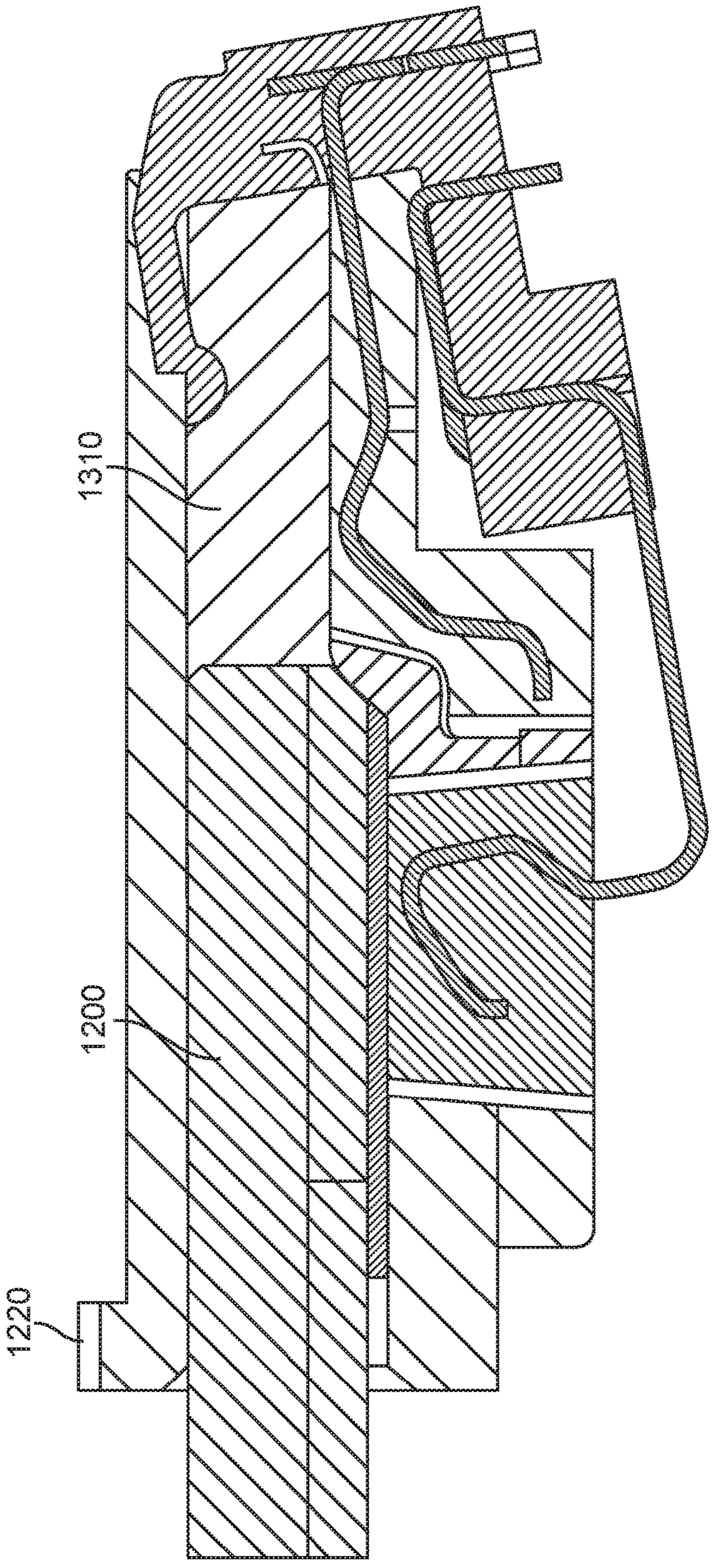

FIG. 14

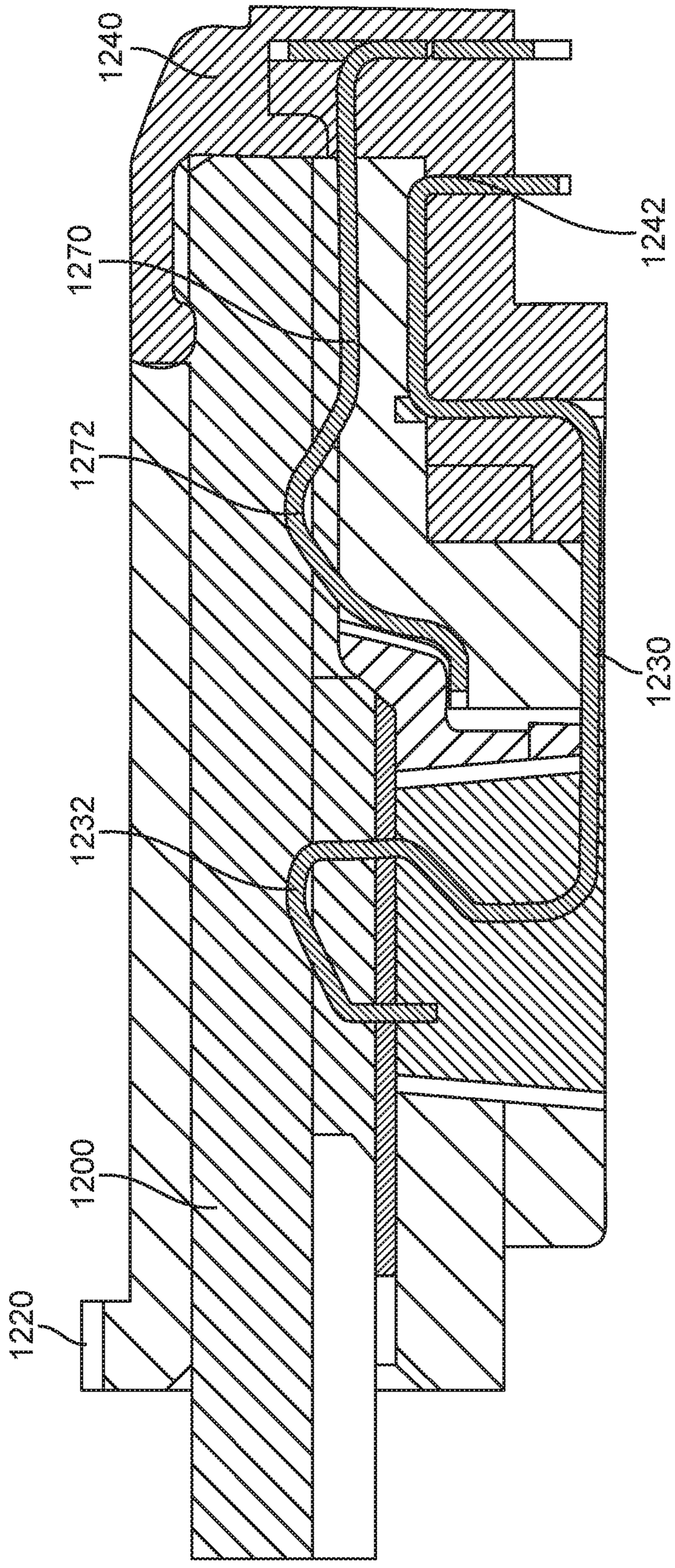

FIG. 15

PROTECTIVE STRUCTURES FOR CONNECTOR CONTACTS

CROSS-REFERENCES TO RELATED APPLICATIONS

This application is a nonprovisional of and claims priority to U.S. patent provisional application No. 62/057,948, filed Sep. 30, 2014, which is incorporated by reference.

BACKGROUND

The number and types of electronic devices available to consumers have increased tremendously the past few years, and this increase shows no signs of abating. Electronic devices, such as portable media players, storage devices, tablets, netbooks, laptops, desktops, all-in-one computers, wearable computing devices, cell, media, and smart phones, televisions, monitors, and other display devices, navigation systems, and other devices have become ubiquitous.

These electronic devices may include one or more connector receptacles, which may often appear as a cavity on a side of an electronic device. These receptacle cavities may be arranged to receive a second electronic device or a connection to a second electronic device. For example, they may be arranged to receive a device such a memory or circuit module device. These devices may include cards such as Secure Digital cards, memory sticks, compact flash, wireless transceivers, and other types of cards and modules. The receptacle cavity may also be arranged to receive a connector insert, which may be connected to a cable, a docking station, or other electronic component.

These devices have become smaller and slimmer with each succeeding generation. At the same time, they have been designed to include ever-increasing levels of functionality. The trend for the foreseeable future is to pack more features into increasingly smaller devices. As a result, many parts of these devices, such as casings, power supplies, and circuits have become smaller. It may be desirable to further reduce the size of other components as well. For example, it may be desirable to reduce the size of these connector receptacles. Space saved by providing a reduced size connector receptacle may be used to shrink the size of the electronic device, it may be used to increase functionality, or both.

The connector receptacle may include a number of contacts to mate with contacts on these devices or inserts. These electrical connections pathways may form paths for power and data. When a connector receptacle is made smaller, its contacts may become smaller as well. These smaller contacts may be increasingly vulnerable to damage.

Thus, what is needed are connector receptacles having protective structures for connector contacts.

SUMMARY

Accordingly, embodiments of the present invention provide connector receptacles having protective structures for connector contacts. An illustrative embodiment of the present invention may provide a connector receptacle having one or more contacts that are reinforced with protective nonconductive pieces around a portion of one or more contacts. The protective pieces may have an opening for contacting portions of the contacts such that electrical connections may be made between the contacts and contacts on a device, module, or connector insert. The reinforcing protective pieces may protect contacts in a connector receptacle from damage

when a device, module, or connector insert is inserted into the connector receptacle at an oblique angle, when a device, module, or insert is stressed while in the receptacle, or when the device, module, or connector insert is removed from the receptacle at an oblique angle.

Another illustrative embodiment of the present invention may provide a connector receptacle having two or more contacts, where each contact is reinforced with a protective nonconductive piece around a portion of the contact. These protective pieces may be adjacent to each other to provide additional protective reinforcement. These adjacent pieces may protect contacts in a connector receptacle from damage.

Another illustrative embodiment of the present invention may provide a connector receptacle having two or more contacts, where each contact is reinforced with a protective nonconductive piece around a portion of the contact. These protective pieces may interlock with each other to provide additional protective reinforcement. These interlocking pieces may protect contacts in a connector receptacle from damage.

In various embodiments of the present invention, the protective pieces may interlock in various ways. For example, a first piece may have a lengthwise tab. This tab may fit in a lengthwise slot in a second piece. This interlocking arrangement may allow some relative movement between the pieces and therefore their contacts. This may help in ensuring that the contacts in the receptacle are sufficiently planar to make contact with corresponding contacts on a device, module, or connector inset.

Another illustrative embodiment of the present invention may provide a connector receptacle having two or more contacts, where the two or more contacts are reinforced with a protective nonconductive piece around portions of both of the contacts. This protective piece may be adjacent or interlocking with other similar pieces to provide additional protective reinforcement. These pieces may protect contacts in a connector receptacle from damage.

Another illustrative embodiment of the present invention may provide a connector receptacle having a housing having a bottom surface. The bottom surface may have one or more openings. These various reinforcing protective pieces may be located in the openings in the bottom surface of the housing to provide additional reinforcement and protection.

In various embodiments of the present invention, the components of the receptacles may be formed in various ways of various materials. For example, contacts or pins and other conductive portions of the receptacles may be formed by stamping, metal-injection molding, machining, micromachining, 3-D printing, or other manufacturing process. The conductive portions may be formed of stainless steel, steel, copper, copper titanium, phosphor bronze, or other material or combination of materials. They may be plated or coated with nickel, gold, or other material. The nonconductive portions, such as the protective pieces, the receptacle housings and other portions, may be formed using injection or other molding, 3-D printing, machining, or other manufacturing process. The nonconductive portions may be formed of silicon or silicone, rubber, hard rubber, plastic, nylon, elastomers, liquid-crystal polymers (LCPs), ceramics, or other nonconductive material or combination of materials.

Embodiments of the present invention may provide receptacles that may be located in, and may connect to, various types of devices, such as portable computing devices, tablet computers, desktop computers, laptops, all-in-one computers, wearable computing devices, cell phones, smart phones, media phones, storage devices, portable media players,

navigation systems, monitors, power supplies, adapters, remote control devices, chargers, and other devices. These connector receptacles may provide pathways for signals and power for cards or other modules, such as Secure Digital cards, Secure Digital High Capacity cards, Secure Digital Extended Capacity cards, Secure Digital Ultra-High-Capacity I cards, Secure Digital Ultra-High-Capacity II cards, memory sticks, compact flash cards, communication modules, and other devices and modules that have been developed, are being developed, or will be developed in the future. These connector receptacles may provide pathways for signals that are compliant with various standards such as Universal Serial Bus (USB), High-Definition Multimedia Interface® (HDMI), Digital Visual Interface (DVI), Ethernet, DisplayPort, Thunderbolt™, Lightning™, Joint Test Action Group (JTAG), test-access-port (TAP), Directed Automated Random Testing (DART), universal asynchronous receiver/transmitters (UARTs), clock signals, power signals, and other types of standard, non-standard, and proprietary interfaces and combinations thereof that have been developed, are being developed, or will be developed in the future.

Various embodiments of the present invention may incorporate one or more of these and the other features described herein. A better understanding of the nature and advantages of the present invention may be gained by reference to the following detailed description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates an electronic device that may be improved by the incorporation of embodiments of the present invention;

FIG. **2** illustrates a connector receptacle according to an embodiment of the present invention;

FIG. **3** illustrates a closer view of protective pieces and contacts according to an embodiment of the present invention;

FIG. **4** illustrates another view of protective pieces and contacts according to an embodiment of the present invention;

FIG. **5** illustrates a partial cutaway view of protective pieces and contacts according to an embodiment of the present invention;

FIG. **6** illustrates a close-up view of a protective piece and a contact according to an embodiment of the present invention;

FIG. **7** illustrates a close-up view of a protective piece and a contact according to an embodiment of the present invention;

FIG. **8** illustrates an assembly of two protective pieces according to an embodiment of the present invention;

FIG. **9** illustrates an exploded view of a connector receptacle according to an embodiment of the present invention;

FIG. **10** illustrates protective pieces and contacts according to an embodiment of the present invention;

FIG. **11** illustrates protective pieces and contacts according to an embodiment of the present invention;

FIG. **12** illustrates an oblique view of a card and connector receptacle according to an embodiment of the present invention; and

FIG. **13-15** illustrate the insertion of a card into a connector receptacle according to an embodiment of the present invention.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

FIG. **1** illustrates an electronic device **100** that may be improved by the incorporation of embodiments of the present invention. In this particular example, electronic device **100** may be a monitor or an all-in-one computer. Other types of electronic devices, such as portable media players, storage devices, tablets, netbooks, laptops, desktops, wearable computing devices, cell, media, and smart phones, televisions, and other display devices, navigation systems, and other types of devices may also be improved by the incorporation of embodiments of the present invention.

In this example, memory card **110** may be inserted into connector receptacle **120** located in the housing of electronic device **100**. In a specific embodiment of the present invention, connector receptacle **120** may be arranged to receive a Secure Digital memory card **110**. In other embodiments of the present invention, connector receptacle **120** may be configured to receive other types of memory cards or electronic devices, modules, or connections to other electronic devices, such as a cable or docking station insert. These and other devices may be referred to collectively as devices, modules, and inserts.

Again, it may be desirable to reduce the space consumed by connector receptacle **120**. By shrinking the space consumed by connector receptacle **120**, electronic device **100** may be made smaller, may include additional functionality, or both.

In various embodiments of the present invention, the space consumed by connector receptacle **120** may be reduced by reducing its depth. But reducing the depth of connector receptacle **120** may lead to at least three potential vulnerabilities. The first is that when memory card **110** is inserted into a shallow-depth connector receptacle **120**, more of the memory card **110** is exposed outside of the housing of electronic device **100**. This leaves memory card **110** vulnerable to being inadvertently hit or struck by other equipment or users.

The second of the vulnerabilities is that a user may incorrectly insert memory card **110**. For example, a user may incorrectly insert memory card **110** at an oblique angle relative to the connector receptacle **120**. Because connector receptacle **120** is shallow, contacts in connector receptacle **120** may be relatively close to the surface of the housing of electronic device **100**. When a user inserts memory card **110** improperly, a corner or edge of memory card **110** may strike one or more contacts at an angle, thereby possibly causing damage. The third vulnerability may occur when a user may incorrectly extract memory card **110** at an oblique angle relative to the connector receptacle **120**.

Accordingly, embodiments of the present invention may provide connector receptacles having one or more contacts that are reinforced with a protective nonconductive piece around a portion of each contact. An example is shown in the following figure.

FIG. **2** illustrates a connector receptacle according to an embodiment of the present invention. This figure, as with the other included figures, is shown for illustrative purposes and does not limit either the possible embodiments of the present invention or the claims.

Again, it may be desirable to reduce a size of connector receptacle **120**. One way to reduce size may be to move contacts **130** closer to a front opening in the connector receptacle. However, this placement may make contacts **130** particularly susceptible to damage. This may be particularly true where contacts **130** are of a small size to form electrical

connections with small contacts on a device, module, or connector insert. Damage may occur during an insertion of a device, module, or connector insert into connector receptacle **120**. For example, the device, module, or connector insert may be inserted at an oblique angle thereby damaging one or more contacts **130**. Damage may also occur after insertion if a device, module, or connector insert is struck or subjected to stress. Damage may also occur during extraction if a device, module, or connector insert is extracted at an oblique angle.

Accordingly, embodiments of the present invention may provide reinforcing protective pieces **140**. Protective pieces **140** may be formed at least around a portion of contacts **130**. Protective pieces **140** for two or more contacts **130** may be adjacent to each other. This proximity may provide further reinforcement and protection for contacts **130**. Protective pieces **140** for two or more contacts **130** may be interlocking with each other. This interlocking may provide further protection for contacts **130**. The interlocking pieces may have some freedom of movement an up and down or Z. direction. This may allow contacting portions of contacts **130** to be sufficiently planarized such that they may form electrical connections with corresponding contacts on a device, module, or connector insert.

Receptacle **120** may also include housing **150**. Housing **150** may include openings **154**. Protective pieces **140** for two or more contacts may be located in an opening **154** in a bottom surface of housing **150**. Again, this location may provide additional reinforcement and protection for contacts **130**. Housing **150** may include posts **152**, which may be placed in openings a printed circuit board or other appropriate substrate in electronic device **100**. Shield **160** may substantially surround housing **150**. Shield **160** may include tabs **162** that may form ground connections with ground traces or planes in a printed circuit board or other appropriate substrate in electronic device **100**. Connector receptacle **120** may further include additional contacts **170**. Additional contacts **170** may be arranged in a row behind contacts **130**. Additional contacts **170** may be protected from damage by the presence of contacts **130** and protective pieces **140**.

FIG. **3** illustrates a closer view of protective pieces and contacts according to an embodiment of the present invention. In this example, protective pieces **140** may include a first piece **310** and a second piece **320**. In this example, piece **310** and **320** may be interlocking Pieces **310** and **320** may be formed around at least a portion of contacts **130**. Contacting portions **132** may be exposed at a top of plastic pieces **310** and **320**. Contacting portions **132** may form electrical connections with contacts on a device, module, or insert when it is inserted into the connector receptacle.

Contacts **130** may include barbs **134**. Burbs **134** may be set in housing **150** in receptacle **120**. Barbs **134** may be nested in a staggered manner as shown in this and the other examples. Through-hole contacting portions **136** may be provided at the ends of contacts **130**. Through-hole contacting portions **136** may form electrical connections with traces on a printed circuit board or other appropriate substrate in electronic device **100**.

FIG. **4** illustrates another view of protective pieces and contacts according to an embodiment of the present invention. Again, protective pieces **140** may include interlocking pieces **310** and **320**. Contacts **130** may include contacting portions **132**, which may be exposed at a top of protective pieces **140**. The interlocking pieces **310** and **320** may be able to move a small amount relative to each other. This may ensure that contacting portions **132** are sufficiently planarized such that each contacting portion **132** forms electrical connections with contacts on a device, module, or connector insert that is inserted in receptacle **120**.

FIG. **5** illustrates a partial cutaway view of protective pieces and contacts according to an embodiment of the present invention. This cutaway view illustrates the interlocking nature of interlocking pieces **310** and **320**. Specifically, a lengthwise tab **322** on protective piece **320** may fit in a lengthwise slot **312** in protective piece **310**. These interlocking features may provide reinforcement to further protect contacts **130** from damage due to either and oblique insertion or extraction of a device, module, or connector insert into or out of a receptacle, or a stress placed on a device, module, or connector insert once it is in the receptacle.

FIG. **6** illustrates a close-up view of a protective piece and a contact according to an embodiment of the present invention. Again, protective piece **310** may include a lengthwise notch **312**. Protective piece **310** may be formed around at least a portion of contact **130**. A contacting portion **132** of contact **130** may be exposed at a top of protective piece **310** such that contacting portion **32** may form electrical connections with contacts on a device, module, or connector insert when the device, module, or connector insert is inserted in connector receptacle **120**.

FIG. **7** illustrates a close-up view of a protective piece and a contact according to an embodiment of the present invention. Again, protective piece **320** may include a lengthwise tab **322**. Protective piece **320** may be formed around at least a portion of contact **130**. A contacting portion **132** of contact **130** may be exposed a top of protective piece **320** such that contacting portion **320** may form an electrical connection with a contact on a device, module, or connector insert.

FIG. **8** illustrates an assembly of two protective pieces according to an embodiment of the present invention. In this example, tab **422** on protective piece **320** may be inserted into notch **312** in protective piece **310**. Insertion may be complete when face **810** mates with face **820**.

FIG. **9** illustrates an exploded view of a connector receptacle according to an embodiment of the present invention. Connector receptacle **120** may include a housing **150**. Housing **150** may include a number of openings **154** in a bottom surface. Contacts **130** and protective pieces **310** and **320** may be located in housing **150** such that protective pieces **310** and **320** reside in openings **154**. In this example, two sets of protective pieces **310** and **320** may reside in each opening **154**. Openings **154** may also provide space for protective pieces **310** and **320** and contacts **130** to deflect during an insertion of a device, module, or insert. Downward facing barbs **134** on contacts **130** may be inserted into corresponding slots or openings in a top surface of a bottom of housing **150**. That is, these barbs may be inserted in a top surface of a bottom of housing **150**. A second row of contacts **170** may also be inserted into housing **150**. Contacts **170** may have upright barbs **172** to fit in a bottom side of the bottom of housing **150**. Detect contacts **920** and **930** may also be located in housing **150**. Side contacts **910** may be placed in openings **156** in sides of housing **150**. Side contacts **910** may help to hold a Secure Data or other card in place when it is inserted into receptacle **120**. Receptacle **120** may further include shield **160**. Shield **160** may include tabs **164** for holding side ground contacts **910** in place. Shield **160** may further include tab **162**, which may be inserted into an opening in a printed circuit board or other appropriate substrate. Plastic pieces **912** may be used to hold side ground contacts **910** in place.

In other embodiments of the present invention, other types of protective pieces may be used. For example, instead

of two interlocking pieces around two contacts, a single protective piece may be formed around two contacts. An example is shown in the following figure.

FIG. **10** illustrates protective pieces and contacts according to an embodiment of the present invention. In this example, a protective piece **1010** may be formed around portions of two or more contacts **130**. As before, contacts **130** may include barbs **134**. Barbs **134** may be nested as shown. This nesting may allow contacts **130** to be securely inserted in a connector receptacle housing while consuming a minimal amount of area.

In other embodiments of the present invention, a protective piece may be formed around each contact. These contacts may be adjacent to each other for additional protection and reinforcement. An example is shown in the following figure.

FIG. **11** illustrates protective pieces and contacts according to an embodiment of the present invention. In this example, protective pieces **1100** may be formed around at least a portion of contacts **130**. As in the other examples, a contacting portion **132** may be exposed above these protective pieces **1100** such that the contacting portions **132** may form electrical connections with contacts on a device, module, or connector insert.

In other embodiments of the present invention, instead of protecting contacts with a protective piece, contacts may be located out of a path of insertion for a card until a card is inserted or nearly inserted into a receptacle. This may help protect contacts in a connector receptacle when a device, module, or connector insert is inserted or extracted from a connector receptacle. An example is shown in the following figure.

FIG. **12** illustrates an oblique view of a card and connector receptacle according to an embodiment of the present invention. In this example, card **1200** is being inserted into connector receptacle **1220**. Connector receptacle **1220** may include a number of contacts **1230**. Contacts **1230** may be out of a path of insertion of card **1200**. When card **1200** reaches housing portion **1240** at a back side of connector receptacle **1220**, housing portion **1240** may rotate, thereby bringing contacts **1230** into contact with contacts on an underside of card **1200**. This is shown further in the following figures.

FIG. **13-15** illustrate the insertion of a card into a connector receptacle according to an embodiment of the present invention. FIG. **13** illustrates a side view of a connector receptacle according to an embodiment of the present invention. Again, receptacle **1220** may include an insertion path **1310** for a card. Receptacle **1220** may include a main housing portion **1250** and a rear housing portion **1240**. Rear housing portion **440** may rotate around the location **1242**. When a card is not inserted into insertion path **1310**, contacts **1230** including contacting portions **1232** may remain out of the insertion path **1310**, and are thereby protected from an oblique insertion. In various embodiments of the present invention, a spring or other force may be used to maintain contacts **1230** out of card path **1310** when a card is not inserted fully or nearly fully in connector receptacle **1220**. In FIG. **14**, card **1200** is being inserted into insertion path **1310** in housing **1220**. In FIG. **15**, card **1200** has been inserted into receptacle **1220**. Rear housing portion **1240** has rotated around location **1242** such that contacting portions **1232** of contacts **1230** are brought into contact with corresponding contacts on a bottom side of card **1200**. Similarly, contacting portions **1272** of contacts **1270** are also brought into electrical contact with contacts on an underside of card **1200**.

In various embodiments of the present invention, the components of the receptacles may be formed in various ways of various materials. For example, contacts or pins and other conductive portions of the receptacles may be formed by stamping, metal-injection molding, machining, micro-machining, 3-D printing, or other manufacturing process. The conductive portions may be formed of stainless steel, steel, copper, copper titanium, phosphor bronze, or other material or combination of materials. They may be plated or coated with nickel, gold, or other material. The nonconductive portions, such as the protective pieces, receptacle housings and other portions may be formed using injection or other molding, 3-D printing, machining, or other manufacturing process. The nonconductive portions may be formed of silicon or silicone, rubber, hard rubber, plastic, nylon, elastomers, liquid-crystal polymers (LCPs), ceramics, or other nonconductive material or combination of materials.

Embodiments of the present invention may provide receptacles that may be located in, and may connect to, various types of devices, such as portable computing devices, tablet computers, desktop computers, laptops, all-in-one computers, wearable computing devices, cell phones, smart phones, media phones, storage devices, portable media players, navigation systems, monitors, power supplies, adapters, remote control devices, chargers, and other devices. These connector receptacles may provide pathways for signals and power for cards or other modules, such as Secure Digital cards, Secure Digital High Capacity cards, Secure Digital Extended Capacity cards, Secure Digital Ultra-High-Capacity I cards, Secure Digital Ultra-High-Capacity II cards, memory sticks, compact flash cards, communication modules, and other devices and modules that have been developed, are being developed, or will be developed in the future. These connector receptacles may provide pathways for signals that are compliant with various standards such as Universal Serial Bus (USB), High-Definition Multimedia Interface® (HDMI), Digital Visual Interface (DVI), Ethernet, DisplayPort, Thunderbolt™, Lightning™, Joint Test Action Group (JTAG), test-access-port (TAP), Directed Automated Random Testing (DART), universal asynchronous receiver/transmitters (UARTs), clock signals, power signals, and other types of standard, non-standard, and proprietary interfaces and combinations thereof that have been developed, are being developed, or will be developed in the future.

The above description of embodiments of the invention has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form described, and many modifications and variations are possible in light of the teaching above. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications to thereby enable others skilled in the art to best utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. Thus, it will be appreciated that the invention is intended to cover all modifications and equivalents within the scope of the following claims.

What is claimed is:

1. A connector receptacle comprising:

a first contact;

a first piece around a portion of the first contact such that a contacting portion of the first contact is exposed;

a second contact; and

a second piece around a portion of the second contact such that a contacting portion of the second contact is exposed,

wherein a tab on the first piece fits in a slot in the second piece such that the first piece and the second piece are interlocking.

2. The connector receptacle of claim **1** wherein the first contact is conductive and the first piece is nonconductive.

3. The connector receptacle of claim **2** wherein the first piece is formed of plastic.

4. The connector receptacle of claim **1** wherein the tab on the first piece extends lengthwise along a length of the first contact and the slot in the second piece extends lengthwise along a length of the second contact.

5. The connector receptacle of claim **4** wherein the first piece and the second piece are located in a single opening in an opening in a bottom surface of a housing for the connector receptacle.

6. The connector receptacle of claim **1** wherein the connector receptacle is a receptacle for a secure digital card.

7. The connector receptacle of claim **1** wherein the connector receptacle is a receptacle for a secure digital ultra-high-speed II card.

8. A connector receptacle comprising:

a first contact;

a first piece around a portion of the first contact such that a contacting portion of the first contact is exposed;

a second contact; and

a second piece around a portion of the second contact such that a contacting portion of the second contact is exposed,

wherein the first piece and the second piece are adjacent to each other and a tab on the first piece fits in a slot in the second piece such that the first piece and the second piece are interlocking.

9. The connector receptacle of claim **8** wherein the first piece and the second piece are interlocking.

10. The connector receptacle of claim **9** wherein the tab on the first piece extends lengthwise along a length of the first contact and the slot in the second piece extends lengthwise along a length of the second contact.

11. The connector receptacle of claim **10** wherein the first piece and the second piece are located in a single opening in an opening in a bottom surface of a housing for the connector receptacle.

12. The connector receptacle of claim **8** wherein the first piece and the second piece are plastic.

13. The connector receptacle of claim **8** wherein the connector receptacle is a receptacle for a secure digital card.

14. The connector receptacle of claim **8** wherein the connector receptacle is a receptacle for a secure digital ultra-high-speed II card.

15. A connector receptacle comprising:

a housing having a plurality of openings in a bottom surface;

a first contact;

a first piece around a portion of the first contact such that a contacting portion of the first contact is exposed;

a second contact; and

a second piece around a portion of the second contact such that a contacting portion of the second contact is exposed,

wherein a tab on the first piece fits in a slot in the second piece such that the first piece and the second piece are interlocking, and

wherein the first piece and the second piece are located in a single opening in an opening in the bottom surface of the housing.

16. The connector receptacle of claim **15** wherein the first piece and the second piece are adjacent.

17. The connector receptacle of claim **16** wherein the first piece and the second piece are interlocking.

18. The connector receptacle of claim **15** wherein the tab on the first piece extends lengthwise along a length of the first contact and the slot in the second piece extends lengthwise along a length of the second contact.

19. The connector receptacle of claim **15** wherein the connector receptacle is a receptacle for a secure digital card.

20. The connector receptacle of claim **15** wherein the connector receptacle is a receptacle for a secure digital ultra-high-speed II card.

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